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ABSTRACT

Using the ERIC/ONTAP file, student searchers may improve their online skills by employing an 8-step search strategy technique. ERIC/ONTAP, now available through LRS/DIALOG, uses a subset of the ERIC file with built-in answer sets and a special evaluation command. The training procedure guides the student from the initial search interview to the search evaluation through these steps: defining the information need and search objective, identifying relevant databases, identifying the retrieval system, formulating basic search logic, compiling the search terms, conceptualizing the search as input to the retrieval system, evaluating preliminary results, and evaluating final results. Steps one through five, relating to the search interview and the search formulation, do not require the computer and may be practiced off-line. Three modes of searching--high recall, briefsearch, and high precision--are employed to present alternative search strategies for the online search. The results are evaluated by comparing citations retrieved to a "perfect answer set" and using the evaluation command to display recall and precision percentages. (RAA)

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THE ANATOMY OF A SEARCH

NOVEMBER 10, 1979

VIRGINIA LIBRARY ASSOCIATION

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Syracuse, New York

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Introduction to ERIC/ONTAP

As more and more searchers gain experience, there appears to be a need for online and offline aids to support searchers through the "improver" stage of training and practice. Few examples serving this purpose can be found; at ERIC/IR, we learned of a project in this area in early 1977. At the suggestion of, and with the encouragement and support of Oscar Firschein at Lockheed Information Systems, Charles Bourne and his colleagues at the Institute for Library Research (ILR) of the University of California, Berkeley, were developing a special ERIC/DIALOG file for online training and practice. The Berkeley group developed "answer sets" for some twenty search requests by exhaustively searching a file of ERIC 1975 records for relevant citations. The composite results of all their search strategies for each question became the so-called "perfect answer set." And for each search topic, they offered several search strategies to meet different search objectives, e.g. low cost, all relevant citations, etc.

Oscar Firschein arranged to have 1975 ERIC accessions and the twenty-nine search questions and their answer sets loaded on the DIALOG system. He developed and implemented the EVALUATION command which automatically computes performance measures, i.e. recall and precision scores, for any searcher's efforts on the ONTAP search topics by comparing the searcher's results with the "perfect answer set."

A draft report was prepared by the Berkeley group to document their work, but it could not be published before they left ILR. In late 1977

at ERIC/IR, we worked from their draft with their permission, and developed an "improver's manual" for searching the ONTAP data base online.

ERIC/ONTAP is a collection of RIE and CIJE citations from the 1975 portion of the full ERIC data base which ranges from 1966 to the present. Its contents correspond to citations in all 1975 printed ERIC indexes, but not necessarily to a 1975 publication date (i.e. EJ101873-EJ121929, ED095254-ED110594). Searching ERIC/ONTAP is exactly the same in all respects, data elemtns, searchable fields, etc., as searching 1975 accessions in the complete DIALOG ERIC file 1.

ONTAP represents less than 10% of the total ERIC data base (35,400 records). There are points to remember when using the file:

1. Since the file is small, you will not encounter problems involving size, e.g. what do you do when you still have a large number of postings in your final answer set?

2. Seven editions of the ERIC Thesaurus were used in order to index the full ERIC data base, but only the fifth edition was used for ERIC/ONTAP indexing. Thus, shifts in meaning and usage of terms over the period of a decade do not occur in ONTAP to the same extent as in file 1.

The search queries represent real, not synthetic questions since they are assembled from questions posed to reference librarians and ERIC Clearinghouse searchers. Level of difficulty varies from query to query and they are graded as simple, moderate, and difficult in the online ONTAP file. "Named object" search topics, e.g. 4 H Clubs, 16 Personality Factor Test, may be easiest to perform but they involve problems for the online searcher, which, if worked out, will help in more complex search topics.

The unusual feature of the ERIC/ONTAP file is that is contains "answer sets" (which are merely lists of ERIC accession numbers) to

the predetermined list of simple, moderate, and difficult search topics. Searchers using the ONTAP data base for self-improvement exercises can perform a search for the topic and compare their results with the "answer set" for that query. The "answer sets," lists of ERIC records judged relevant to the topic, were compiled on the basis of reviewing the total record in ERIC/ONTAP, not on the basis of examination or analysis of the full document or article.

In keeping with the title of this presentation, "The Anatomy of a Search," let's select an ONTAP search topic, and analyze it step by step as it is searched in DIALOG's ONTAP data base.

Introduction to the Steps of Online Searching

Online searching has been divided into eight steps, each requiring offline activities in preparation for the online activity. As you progress from one step to the next, you will be faced with decisions which will affect succeeding steps. Briefly, the steps are as follows: (see overhead 1).

Step 1. Defining the Information Need and Search Objectives

The first step in the search model is to identify the client's information need through personal or telephone interviews or written messages. Since this activity forms the basis of the search strategy, it is necessary that the information need be described in as precise, specific and complete a manner as possible.

Here is a checklist of questions to which you ought to have answers before the client departs from the presearch interview. You might consider including some of these questions on your search request forms

so that you remember to cover all these areas. (See overhead 2)

At this point, let's select a search topic from the ONTAP file. After signing on to DIALOG, enter the BEGIN 201 command to start searching the file. Let's review the list of medium search topics obtained by the ?TAPMED command (see overhead 3).

We'll choose number M08, school busing and racial integration, since it seems an appropriate theme for all seasons. Keep in mind its accession number, M08, since we'll need it later on. Looking back on the information need checklist, let's first construct a search strategy for high recall, i.e. all the relevant citations in the data base.

Step 2. Identifying Relevant Data Bases

With over 150 bibliographic data bases online currently, this step in the search process is becoming more and more difficult. For the purpose of this presentation, however, it is assumed that ERIC/ONTAP is the first choice and we will move on.

For help in this area, the ONTAP Manual lists some recent articles on multiple data base searching; Online, Online Review, and DataBase magazines offer articles in this area on occasion. Both BRS and SDC have single data bases which act as indexes to social science data base contents. Searching manuals published by all three commercial search services also provide clues as the data base subject contents.

Step 3. Identifying the Retrieval System

Although we will not consider this aspect in our search today since ERIC/ONTAP is only available on LRS/DIALOG, let me capsulize some points on system differences for ERIC searching in a cross retrieval comparison. The commercial services, BRS, LRS, and SDC,

reformat the ERIC data base to fit their system standards since they market other data bases as well and offer special searching features which make their own search services more diversified than ERIC.

Although ERIC sends the same information to each vendor, the reformatting and system differences among the services themselves result both in differences in the way ERIC must be searched and in the results obtained. Since online searchers switch back and forth among retrieval systems, e.g. to search other relevant data bases, take advantage of discounts based on volume of use, or use specific retrieval system features, these differences are becoming increasingly important.

One might take into consideration the contents of the basic index, i.e. all directly searchable fields, for the data base(s) of interest. Here we see that the set of fields which comprise the basic index of the ERIC data base differ among the three systems (see Overhead 4). SDC does not allow direct access to the identifier or abstract fields. LRS and BRS process sponsoring agency and corporate source fields into the basic index which may contribute to false drops. Only BRS made two of the three new ERIC data elements, geographic source and government level, directly searchable.

Conventions for designating directly searchable controlled vocabulary fields in a single operation show how differently ERIC descriptors are handled on the three systems (see Overhead 5). Other matters to be concerned with when selecting a retrieval system are recency of data base updates and unique search features, e.g. online thesaurus, negative data element indicators, etc.

Step 4. High Recall Search: Formulating Basic Search Logic - Planning Search Strategies

Taking our search topic, I've isolated two facets: INTEGRATION and BUSING. These facets are represented by circles; where they intersect forms the portion of the data base which contains records with both facets (see Overhead 6). Another approach might yield three facets: INTEGRATION, BUSING and SCHOOLS. Note that differences in conceptualizing the query will produce different search formulations and online results. The approaches to representing each concept in a query and the combination of concept groups form the central core of the online search strategy process.

Step 5. High Recall Search: Compiling the Search Terms

Before going online, some check of word lists and thesauri will help insure that the search terms lead to useful results. In the ERIC data base, the descriptor and identifier fields contain terminology which has been assigned by ERIC Clearinghouse staff. The Thesaurus of ERIC Descriptors is an example of a controlled vocabulary which is used by the indexer in ERIC Clearinghouses. If the Thesaurus is also used by the searcher, the intellectual effort required to compile the search terms can be reduced as it serves as a control on variant word forms, synonyms and homographs. For example the Thesaurus suggests a number of search terms to represent the concept of INTEGRATION: Racial Integration, Integration Plans, Integrated Public Facilities, etc.

The identifier field contains names of persons, places, things, which are important terms associated with the item. No controlled list like the Thesaurus is used by the indexer when identifiers are

noted, but there are some rules for entry which control this operation, and each identifier is now being reviewed and checklists compiled by the ERIC Network.

Controlled vocabulary fields are not the only sources of searching vocabulary. The free text searching capability of DIALOG allows for the scanning of all subject-conveying fields of the ERIC record: title, abstract, descriptive note, corporate source, sponsoring agency, identifier and descriptor. If a concept like BUSING is not found in the ERIC Thesaurus, terms synonymous with BUSING can be gathered from such lexigraphic sources as the Thesaurus of Psychological Terms, Roget's Thesaurus, Education Index, and so on. This list of search terms compiled from sources other than the ERIC Thesaurus can be searched as free text in all, or a specified number of subject-conveying fields.

Let's take our search topic on School Busing and Racial Integration, and, in the light of our chosen search objective, to retrieve all the relevant documents, i.e. high recall, list all search terms of interest culled from the Thesaurus under the two facets, BUSING and INTEGRATION. Since I am interested in retrieving all the relevant documents, I am going to be as comprehensive as possible when compiling the list of descriptors. (See Overhead 5)

However, we are composing a high recall search and must take into account all searchable fields. Thus, our search formulation, constructed in view of word roots common to these descriptors, will feature free text searching.

Step 6. High Recall Search: Conceptualizing the Search as Input to the Retrieval System

At this point, we are ready to "code" the search so that it can be keyed into the terminal. Those here who are not familiar with the so-called "language" of computer searching could have easily arrived at this point. Together we can develop a search formulation for high recall performance.

The free text terms RACIAL?, INTEGRAT?, DESEGREGAT?, and SEGREGAT?, are common to the long list of descriptors indicating the INTEGRATION facet. I have added the many possible forms of BUSING as single untruncated search terms in order to circumvent retrieving false drops like Busboys, Businessmen, Busybodies, or Bushwhackers. The statement, STUDENT AND TRANSPORTATION, is intended to retrieve records indexed under the descriptor Student Transportation.

Step 7. High Recall Search: Evaluating Preliminary Results

We've retrieved some 63 citations so far. Let's call up some titles of these and make a preliminary assessment of relevance. (See Overhead 8).

Step 8. High Recall Search: Evaluating Final Results

Using the special EVALUATION command available in ONTAP, we can find out whether we've achieved our objective of retrieving all the relevant documents (see Overhead 9). In order to find out how many citations are in the "perfect answer set," the accession number M08 is selected. The next step is to combine our final answer set with the ONTAP answer set. In this way, we can find out how many items we retrieved are included in the ONTAP answer set. The result of this operation is shown, and indicates that we have retrieved all the relevant items in ONTAP in addition to some non-relevant material.

Although we can figure recall and precision scores by comparing the relevant items listed by ERIC accession number in the ONTAP Manual with a printout of the accession numbers in our final search set, ERIC/ONTAP provides the /EVAL command for computing the scores. The directions are obtained by typing ?EVAL, and, following these, ONTAP computes our recall and precision scores.

We've constructed a high recall formulation employing the Building Block approach to search strategy. This is characterized by developing each aspect of the search separately, as if it were a subsearch all on its own, and then making the final logical assembly of all these sub-programs. If you had performed this search for a client, you might want to conduct a post-search interview and review the results of the search with the client. (See Overhead 10)

Step 4. Briefsearch: Formulating Search Logic

On the other hand, ONTAP provides a testing ground for developing and refining your skills as an online searcher. Instead of a comprehensive search formulation, let's take on a second search objective, a low-cost Briefsearch. This is introduced in order to enact a rapid survey of the file. In this way, we can estimate final search set size and get an idea of the types of articles we might find. You might opt to perform a Briefsearch when the client is unsure about the subject matter of his/her topic, so that you, providing a sample of citations, can help the client rephrase the query. Save searches are particularly useful here in order to retain the routine for a later time.

Step 5. Briefsearch: Compiling the Search Terms

Having scanned the rotated descriptor display of the ERIC Thesaurus, (see Overhead 11) I've chosen the root, INTEGRAT, to indicate the facet

for INTEGRATION since it will retrieve free text terms and twenty-two INTEGRATED or INTEGRATION descriptor phrases. On the other hand, RACIAL would pick up twelve descriptors and free text terms; SEGREGAT would retrieve free text and nine descriptors, and DESEGREGAT only free text terms. I've selected BUS and BUSES because they occur in two of the three controlled vocabulary phrases for BUSING: School Buses and Bus Transportation. I've included BUSING in this facet in order to retrieve free text terms, and, possibly, identifiers, since it is a familiar term to describe this controversial issue.

Step 6. Briefsearch: Conceptualizing the Search as Input to the Retrieval System

There remains to structure the search terms into a single line of typed input. This process has been simplified considerably with the Super Select feature of DIALOG which allows the searcher to perform more than one logical operation in a single line. (See Overhead 12)

Steps 7 and 8. Briefsearch: Evaluating Preliminary and Final Results

Typing out some sample titles, I've scanned them for relevance. Rather than continue this search, I have chosen to compute recall and precision scores employing ONTAP's /EVAL command. As you can see, this "quick and dirty" search provides me with substantial portion of relevant items and, surprisingly, few non-relevant citations.

Step 4. High Precision Search: Formulating Basic Search Logic

Let's make use of ERIC's controlled vocabulary, particularly DIALOG's online Thesaurus feature, in order to improve our precision score. Once again, we will represent the query with two facets, BUSING and INTEGRATION.

Step 5. High Precision Search: Compiling the Search Terms

BUSING can be indicated by three descriptors, Student Transporation, School Buses, and Bus Transportation. The descriptor, Racial Integration, is the preferred term suggested by the ERIC Thesaurus to describe INTEGRATION. Rather than choose terms from this long display of over thirty descriptors and type them into the terminal, let's plan to make use of DIALOG's online Thesaurus and select terms online.

Step 6. High Precision Search: Conceptualizing the Search as Input to the Retrieval System

Much of my search strategy has been developed online. In order to make most use of the interactive capabilities of the online search system, let's continue this search, calling up one or more of these citations for online review, noting the descriptors, and, especially, identifiers found in relevant citations. Then, these terms are incorporated into the formulation to retrieve additional citations. After adding these terms to the formulation, one can again review more retrieved citations and continue this process in successive iterations until no additional terms are found that seem appropriate for inclusion. In my example, I have called up the indexing record of a retrieved item, noted the identifier, Busing, and incorporated it into my strategy. In this way I've retrieved another four citations. (See Overhead 13) This approach to search strategy, citation pearl growing, has helped me increase my final search set without sacrificing precision. (See Overhead 14)

Steps 7 and 8. High Precision Search: Evaluating Preliminary and Final Results

I've included a few titles in the printout in order to assess their relevance before concluding the search. My precision score has increased

in comparison with the first search example which achieved a 69% score. However, I have retrieved a few non-relevant items.

ERIC/ONTAP For Self-Improvement

I have outlined three modes of representing the search topic, School Busing and Racial Integration, in the light of different search objectives. These formulations covered today and those you encounter in the ONTAP manual are intended as paradigms; you should try your own search strategies and compare your output and choice of searching vocabulary with that of the high recall formulation given in the text. For those who neither have access to a terminal nor have learned DIALOG's command language, you should be able, with practice, to work the client's statement of information need from its utterance by the client in the presearch interview (Step 1) to search term selection (Step 5).

Having learned the basics of DIALOG searching, it is suggested that you begin by trying a simple search topic, e.g. Parapsychology. Read the text, develop your strategy, and perform an online search. After figuring recall and precision ratios of your performance, alter your formulation in accordance with a search objective like low cost, immediacy, high recall, or with an approach like Citation Pearl Growing or Most Specific Facet First.

1

DEFINING THE INFORMATION NEED
AND SEARCH OBJECTIVE

Interviewing the information seeker clarifies the request and determines search objectives:

* Retrieve all relevant items, high recall, or
* Retrieve only relevant items, high precision, or
* Retrieve some relevant items, Briefsearch.

2

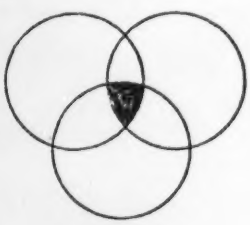
IDENTIFYING RELEVANT
DATA BASES

Determining which online data base to use first, which next, and so on.

3

IDENTIFYING THE
RETRIEVAL SYSTEM

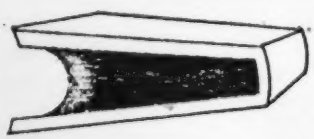
Determining which of the three commercial retrieval systems to search.



4

FORMULATING BASIC SEARCH LOGIC -
PLANNING SEARCH STRATEGIES

Analyzing the search topic into facets or concepts. Planning approaches to search strategy for combining facets of the topic.



5

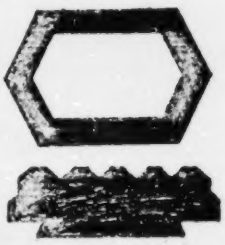
COMPILING THE SEARCH TERMS

Choosing descriptors from the ERIC Thesaurus or other printed word lists. Selecting terms in identifier and free text fields for search subject-conveying fields. Using thesaurus and alphabetic word lists online.

6

CONCEPTUALIZING THE SEARCH AS INPUT TO THE RETRIEVAL SYSTEM

Arranging the search terms into concepts or facets, noting most important and less important facets, restricting and limiting output.



7

EVALUATING PRELIMINARY RESULTS

Reviewing search results, step by step, and considering alternate search strategies to meet search objectives, i.e. recycling steps 1 to 6.

8

EVALUATING FINAL RESULTS

Determining client satisfaction with search results.

2. Checklist of areas to cover during the presearch interview.

CLARIFICATION OF REQUEST

* Is there agreement on the narrative statement of the information need?

REQUEST NEGOTIATION

* Has the search objective been agreed upon?
* Have the subject area terminology and literature sources been discussed?
* Are there any limits or constraints to be imposed on output, e.g. date, language, etc.?

SEARCH VOCABULARY

* Do the client and information specialist agree upon the selection and/or exclusion of search terms?
* Have the options of free text and controlled term searching been discussed?
* What vocabulary aids have been selected?
* Does the client have a citation to an article he/she knows is relevant?

SEARCH STRATEGY FORMULATION

* Is there agreement on the formation of concept groups?
* Have order of search statements and combinations of concept groups been discussed?
* Have output formats and limits been decided?

ADMINISTRATIVE DETAILS

* What are the arrangements concerning delivery of output and billing?
* Has a post-hoc evaluation been arranged?
* Is it necessary to have the client present during the search?

? ?TAPMED

MEDIUM SEARCH TOPICS:

M01 DIRECT CHARGING TO USERS FOR REFERENCE AND CURRENT AWARENESS SERVICE OF LIBRARIES OR OTHER INFORMATION SERVICES

M02 FEDERAL AID TO DAY CARE CENTERS OR SERVICES (INCLUDING HISTORY, PHILOSOPHY, ARGUMENTS PRO & CON, EXPERIENCES, FUNDING, EVALUATION, PARENT INVOLVEMENT AND ATTITUDES) ONLY U.S. CENTERS OR SERVICES

M03 JEAN PIAGET'S THEORIES, AND THOUGHT PROCESSES OR LANGUAGE DEVELOPMENT OF CHILDREN, BUT LIMITED TO PUBLICATIONS AVAILABLE FROM ERIC/EDRS

FOR MORE, ENTER ?TAPMED1

? ?TAPMED1

M04 LIBRARIES & LIBRARIANS IN MIDDLE EAST, (EXCLUDE AFRICAN BUT NOT EGYPT). INCLUDE ALL TYPES OF LIBRARIES & INFORMATION CENTERS

M05 LIBRARY SERVICE TO PHYSICALLY HANDICAPPED

M06 EFFECTS OF TV VIOLENCE ON CHILDREN

M07 DRUG ABUSE, INCLUDING ALCOHOL, AMONG STUDENTS OF ELEMENTARY OR SECONDARY SCHOOLS, GRADES K-12

M08 SCHOOL BUSING & RACIAL INTEGRATION

M09 RECREATIONAL USE OF FOREST LANDS

M10 TITLE 9, 1972 FEDERAL EDUCATION ACT AMENDMENTS, AND WOMEN'S SPORTS

M11 WHITE FLIGHT TO THE SUBURBS

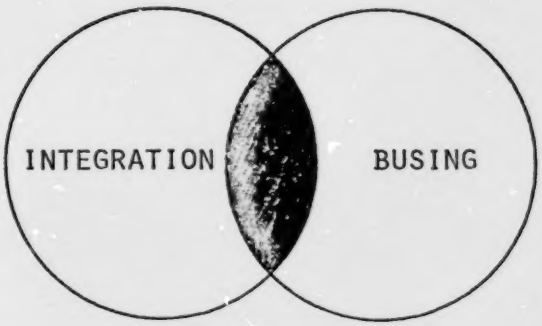
3. Moderately difficult search topics in ERIC/ONTAP.

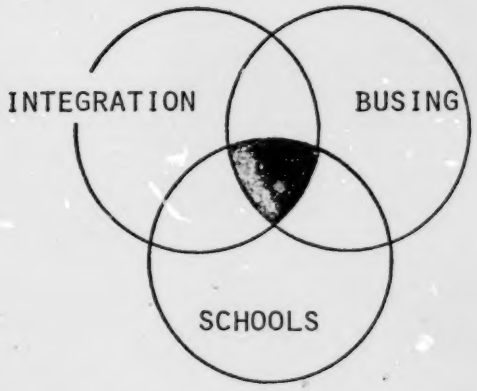
ERIC Field Names	ERIC Codes	LRS	SDC	BRS
Accession number	0010		/AN	.AN.
Author	AUTH 001B	AU=	/AU	.AU.
Geographic source	GEO 004D	CP=	/LO	.GS.
Government level	GOV 004E	GL=	/LO	.GV.
Corporate source	INST 001C	/CS	/OS	.IN.
Sponsoring agency	SPON 0020	/SA	/SPO	.SN.
Title	001A	/TI	/TI	.TI.
Abstract	ABST 002C	/AB	(IN BI)	.AB.
Identifier	IDEN 0024	/ID,/ID* /IF,/IF*	(IN BI)	.ID.
Descriptor	DESC 0023	/DE,/DE* /DF,/DF*	/IT,*/IT /IW,*/IW	.MJ,MN,DE, UJ,UN.
Descriptive note	NOTE 0026	/NT		.NT.
Language	LANG 004C	LA=	/LA	.LG.

4. ERIC Codes and Corresponding LRS, SDC, and BRS Search Qualifiers of the ERIC Unit Record.

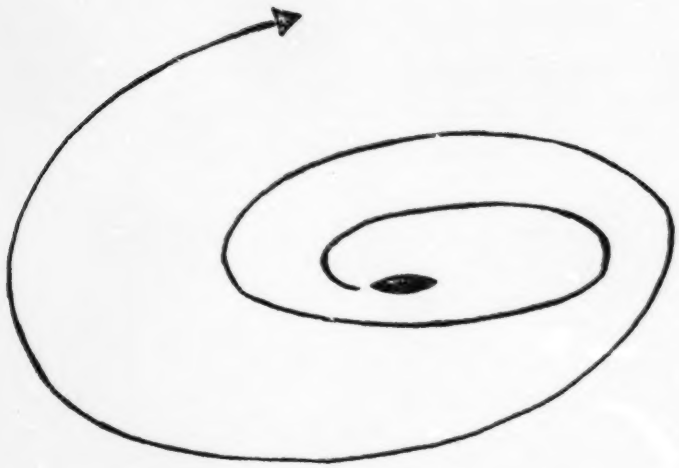
DESCRIPTOR TYPE	LRS	SDC	BRS
MAJOR BOUND DESCRIPTORS	/DF*	*/IT	.MJ.
MINOR BOUND DESCRIPTORS	-	-	.MN.
MAJOR OR MINOR BOUND DESCRIPTORS	/DF	/IT	.MN,MJ.
MAJOR SINGLE DESCRIPTOR WORDS	/DE*	*/IW	.UJ,MJ.
MINOR SINGLE DESCRIPTOR WORDS	-	-	.UN,MN.
MAJOR OR MINOR SINGLE DESCRIPTOR WORDS	/DE	/IT	.DE.

5. CONVENTIONS FOR DESIGNATING DIRECTLY SEARCHABLE CONTROLLED VOCABULARY FIELDS IN A SINGLE OPERATION: DESCRIPTORS.





6. FACETS OF THE SEARCH TOPIC: SCHOOL BUSING AND RACIAL INTEGRATION.



14. THE CITATION PEARL GROWING APPROACH TO SEARCH STRATEGY.

```
? SELECT BUS TRANSPORTATION OR SCHOOL BUSES OR STUDENT
  TRANSPORTATION
            27 BUS TRANSPORTATION
             8 SCHOOL BUSES
            41 STUDENT TRANSPORTATION
     1      62 BUS TRANSPORTATION OR SCHOOL BUSES OR
               STUDENT TRANSPORTATION

? EXPAND (RACIAL INTEGRATION)

REF    INDEX-TERM              TYPE  ITEMS  RT
R1     RACIAL INTEGRATION------      111  30
R2     DESEGREGATION----------U      107   1
...
R5     SOCIAL INTEGRATION------B      47  27
R6     AFFIRMATIVE ACTION------R      38  22
R7     ANTI SEGREGATION
         PROGRAMS--------------R       2   5
...
R11    CLASSROOM INTEGRATION---R     217  32
R12    COLLEGE INTEGRATION-----R      12   5
R13    FACULTY INTEGRATION-----R       9   6
R14    GRADE A YEAR INTEGRATIONR          3
R15    INTEGRATED PUBLIC
         FACILITIES------------R          3
R16    INTEGRATION EFFECTS-----R      52   3
R17    INTEGRATION LITIGATION--R      31   3
R18    INTEGRATION METHODS-----R      56   6
R19    INTEGRATION PLANS-------R      31   1
R20    INTEGRATION READINESS---R       5   2
R21    INTEGRATION STUDIES-----R      20   2
...
R26    RACE RELATIONS----------R     105  16
R27    RACIAL SEGREGATION------R      45  16

? SELECT R1,R5-R7,R11,R14-R21,R27-R31
     2    430 R1,R5-R7,R11,R14-R21,R27-R31
              R1: RACIAL INTEGRATION
```

```
? COMBINE 1 AND 2
     3    25 1 AND 2
? TYPE 3/2/1

3/2/1
EJ115861  EA505972
  RUNNING AND BUSING IN TWENTIETH-CENTURY AMERICA
  BELL, DERRICK A., JR.
  JOURNAL OF LAW AND EDUCATION, 4, 1, 214-217  JAN 75
  DESCRIPTORS:  *SUPREME COURT LITIGATION/  *SCHOOL
INTEGRATION/  *URBAN EDUCATION/  *SCHOOL DISTRICT AUTONOMY/
*HOUSING PATTERNS/  RACIAL SEGREGATION/  EQUAL EDUCATION
  IDENTIFIERS:  *BUSING/  MILLIKEN V BRADLEY

? SELECT #3 OR (BUSING/ID AND #2)
     4    29 #3 OR (BUSING/ID AND #2)
? SELECT AN=M08
     5    43 AN=M08
? COMBINE 4 AND 5
     6    26 4 AND 5
? /EVAL (29,43,26)

INPUT ... EVAL (29,43,26)
NUMBER OF CITATIONS FOUND=  29
NUMBER OF CITATIONS IN ANSWER SET=  43
NUMBER OF RELEVANT CITATIONS FOUND=  26
RECALL=  60.465 %    PRECISION=  89.655 %

LOGOFF
   $0.00  0.112 HRS FILE 201 22 DESCRIPTORS
```

13. HIGH RECALL SEARCH.

BUSING

BUS TRANSPORTATION
SCHOOL BUSES
STUDENT TRANSPORTATION

INTEGRATION

ANTI SEGREGATION PROGRAMS
CLASSROOM INTEGRATION
COLLEGE INTEGRATION
DEFACTO SEGREGATION
DEJURE SEGREGATION
FACULTY INTEGRATION
GRADE A YEAR INTEGRATION
INTEGRATED PUBLIC FACILITIES
INTEGRATION EFFECTS
INTEGRATION LITIGATION
INTEGRATION METHODS
INTEGRATION PLANS
INTEGRATION READINESS
INTEGRATION STUDIES
LEGAL SEGREGATION
NEIGHBORHOOD INTEGRATION
RACE RELATIONS
RACIAL ATTITUDES
RACIAL BALANCE
RACIAL DISCRIMINATION
RACIAL DISTRIBUTION
RACIAL FACTORS
RACIAL INTEGRATION
RACIAL SEGREGATION
RACIALLY BALANCED SCHOOLS
RACISM
SCHOOL INTEGRATION
SCHOOL SEGREGATION
SEGREGATED PUBLIC FACILITIES
SOCIAL INTEGRATION
TOKEN INTEGRATION
VOLUNTARY INTEGRATION

7. ERIC DESCRIPTORS FOR BUSING AND INTEGRATION FACETS.

? SELECT STEPS BUS OR BUSES OR BUSING OR BUSED OR BUSSES OR BUSSED OR BUSSING OR (STUDENT AND TRANSPORTATION)

1	48	BUS
2	14	BUSES
3	33	BUSING
4	3	BUSED
5	1	BUSSED
6	1	BUSSES
7	2	BUSSING
8	7246	STUDENT
9	280	TRANSPORTATION
10	155	1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR (8 AND 9)

? SELECT STEPS RACIAL? OR INTEGRAT? OR DESEGREGAT? OR SEGREGAT?

11	800	RACIAL?
12	1306	INTEGRAT?
13	127	DESEGREGAT?
14	151	SEGREGAT?
15	1947	11 OR 12 OR 13 OR 14

? COMBINE 10 AND 15

16	63	10 AND 15

? TYPE 16/6/13-15

16/6/13
EJ115252
BUSING FOR RACIAL BALANCE

16/6/14
EJ114427
THE CONSTITUTIONALITY OF REVERSE RACIAL DISCRIMINATION

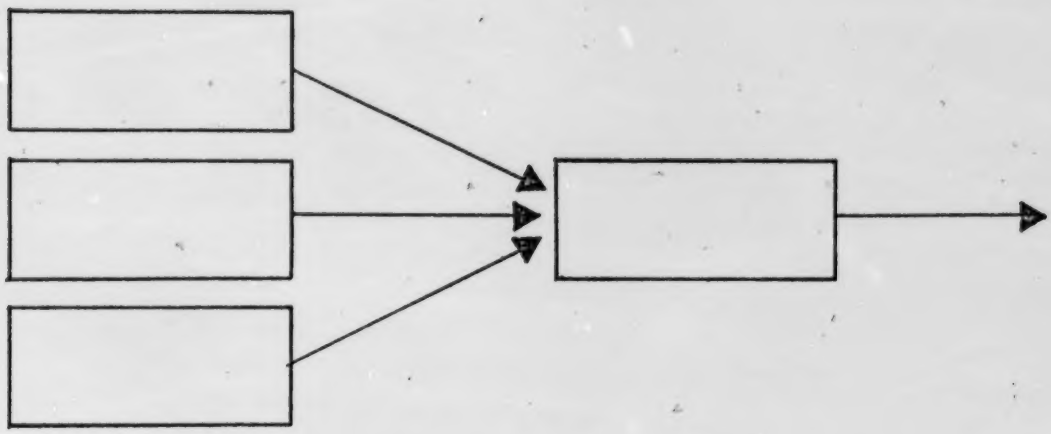
16/6/15
EJ113526
INTEGRATION AND THE BURGER COURT: THE NEW BOUNDARIES OF SCHOOL DESEGREGATION

8. HIGH RECALL FORMULATION: BUSING AND RACIAL INTEGRATION.

```
? SELECT AN=M08
        17      43  AN=M08 (SCHOOL BUSING FOR RACIAL
                            INTEGRATION)
? COMBINE 16 AND 17
        18      43  16 AND 17
? /EVAL (63,43,43)

INPUT ... EVAL (63,43,43)
NUMBER OF CITATIONS FOUND=  63
NUMBER OF CITATIONS IN ANSWER SET=  43
NUMBER OF RELEVANT CITATIONS FOUND=  43
RECALL=  100.000 %   PRECISION=  68.254 %
```

9. PERFORMANCE MEASURES FOR HIGH RECALL FORMULATION.



10. BUILDING BLOCK APPROACH TO SEARCH STRATEGY.

INSURANCE
INTEGERS
INTEGRATED ACTIVITIES
INTEGRATED CURRICULUM
INTEGRATED PUBLIC FACILITIES
CLASSROOM INTEGRATION
COLLEGE INTEGRATION
INTEGRATION EFFECTS
FACULTY INTEGRATION
GRADE A YEAR INTEGRATION
INTEGRATION LITIGATION
INTEGRATION METHODS
NEIGHBORHOOD INTEGRATION
PERSONNEL INTEGRATION
INTEGRATION PLANS
RACIAL INTEGRATION
INTEGRATION READINESS
SCHOOL INTEGRATION
SOCIAL INTEGRATION
INTEGRATION STUDIES
TEACHER INTEGRATION
TOKEN INTEGRATION
VOLUNTARY INTEGRATION
INTEGRITY
INTELLECTUAL EXPERIENCE
ANTI INTELLECTUALISM

11. ERIC ROTATED DISPLAY FOR INTEGRATION DESCRIPTORS.

12. BRIEFSEARCH.

```
? SELECT (BUS OR BUSES OR BUSING) AND INTEGRAT?
            48  BUS
            14  BUSES
            33  BUSING
          1306  INTEGRAT?
     1      35  (BUS OR BUSES OR BUSING) AND INTEGRAT?
? TYPE 1/6/3-6
1/6/3
EJ120204
   BUSING IN BOSTON:  DESEGREGATING THE NATION'S OLDEST
PUBLIC SCHOOL SYSTEM

1/6/4
EJ115861
   RUNNING AND BUSING IN TWENTIETH-CENTURY AMERICA

1/6/5
EJ115858
   BUSING IS STOPPED AT THE CITY LINE

1/6/6
EJ115853
   CONGRESS, THE PRESIDENT, AND ANTI-BUSING LEGISLATION,
1966-1974

? SELECT AN=M08;  COMBINE 1 AND 2
     2     43  AN=M08
     3     30   1 AND 2
? /EVAL (35,43,30)

INPUT ... EVAL (35,43,30)
NUMBER OF CITATIONS FOUND=  35
NUMBER OF CITATIONS IN ANSWER SET=  43
NUMBER OF RELEVANT CITATIONS FOUND=  30
RECALL=  69.767 %    PRECISION=  85.714 %
```